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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,601	10/29/2003	Stephen W. Bedell	YOR920030102US2 (16476Z)	6851
23389	7590	05/06/2004	EXAMINER STEIN, STEPHEN J	
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA GARDEN CITY, NY 11530			ART UNIT 1775	PAPER NUMBER

DATE MAILED: 05/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/696,601	BEDELL ET AL.	
	Examiner	Art Unit	
	Stephen J Stein	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-76 is/are pending in the application.
- 4a) Of the above claim(s) 1-27 and 39-71 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 28-38 and 72-76 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-27 and 39-71, drawn to a method of producing an SiGe on insulator substrate, classified in class 438, subclass 514.
 - II. Claims 28-38 and 72-76, drawn to a substrate material and heterostructure, classified in class 428, subclass 446.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made the materially different process of the buried oxide diffusion barrier without the used of ion implantation such as by joining oxide surfaces of two separate silicon wafers, and then remove backside silicon of one of the wafers to produce a surface suitable for epitaxial growth.

3. During a telephone conversation with Les Szivos on April 29, 2004 a provisional election was made with traverse to prosecute the invention of Group II, claims 28-38 and 72-76.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-27 and 39-71 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

5. **Upon the indication of allowable subject matter of all the elected Group II article claims, the examiner will rejoin and examine the Group I method claims if they are or are amended to be commensurate in scope with the article claims.**

Double Patenting

6. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

7. Claims 28-38 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 28-38 of copending Application No. 10/448,947. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686

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F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 72-74 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 30 and 34 of copending Application No. 10/448,947. Although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious to one of ordinary skill in the art to optimize the surface roughness of the substantially relaxed SiGe layer by any known surface thinning process, since it is known in the art that high surface roughness of SiGe layers makes them unsuitable for device fabrication (See US Patent Application 2002/0185686 A1 – Paragraph 0005).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 28, 30, 32, 34, 72 and 73 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 9 and 12 of U.S. Patent No. 6,515,335. Although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious to one of ordinary skill in the art to limit the defect density to below 5×10^7 atoms/cm², since it is known in the art that limiting defect density, such as threading dislocation density, in relaxed SiGe templates is optimal for

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device performance (See for example US Patent Application 2002/0185686 A1 – Paragraph 0015). Regarding claims 72 and 73, it further would have been obvious to one of ordinary skill in the art to optimize the surface roughness of the substantially relaxed SiGe layer by any known surface thinning process, since it is known in the art that high surface roughness of SiGe layers makes them unsuitable for device fabrication (See US Patent Application 2002/0185686 A1 – Paragraph 0005).

Claims 28-36 and 72-74 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 35-46, 48-50 and 55 of copending Application No. 10/055,138. Although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious to one of ordinary skill in the art to limit the defect density to below 5×10^7 atoms/cm², since it is known in the art that limiting defect density, such as threading dislocation density, in relaxed SiGe templates is optimal for device performance (See for example US Patent Application 2002/0185686 A1 – Paragraph 0015). Regarding claims 72-74, it further would have been obvious to one of ordinary skill in the art to optimize the surface roughness of the substantially relaxed SiGe layer by any known surface thinning process, since it is known in the art that high surface roughness of SiGe layers makes them unsuitable for device fabrication (See US Patent Application 2002/0185686 A1 – Paragraph 0005).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 28-37 and 72-75 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 30-32, 34-37 and 39-41 of copending

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Application No 10/196,611. Although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious to one of ordinary skill in the art to make the measure relaxation value of the substantially relaxed SiGe layer 30 to 100%, since the range falls within the claimed range of the instant application of 1 to 100%.

Regarding claims 72-75, it further would have been obvious to one of ordinary skill in the art to optimize the surface roughness of the substantially relaxed SiGe layer by any known surface thinning process, since it is known in the art that high surface roughness of SiGe layers makes them unsuitable for device fabrication (See US Patent Application 2002/0185686 A1 – Paragraph 0005).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

10. Claims 28-37, 72-74 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,515,335 B1 (Christiansen '335).

Christiansen '335 teaches a heterostructure comprising a silicon substrate, a non-patterned buried oxide insulating layer, and a 15-200 nm thick relaxed single crystal SiGe layer atop the insulating layer (Figure 9, col. 10, lines 10-28). The reference further teaches that a pseudomorphic strained epitaxial Si layer is atop the first relaxed Si Ge layer followed by alternating strained Si and relaxed SiGe layers (col. 10, lines 43-64). Christiansen '335 still further teaches an elastic relaxation of up to about 70% of the relaxed SiGe layer (col. 5, lines 51-66).

Regarding claims 28-37, although Christiansen '335 fails to specifically teach the claimed defect density, it would have been obvious to one of ordinary skill in the art to limit the

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defect density to below 5×10^7 atoms/cm², since it is known in the art that limiting defect density, such as threading dislocation density, in relaxed SiGe templates is optimal for device performance (See for example US Patent Application 2002/0185686 A1 – Paragraph 0015).

Further, regarding claims 72-74 and 76, although Christiansen '335 fails to specifically teach the claimed surface roughness, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the surface roughness since it is known in the art that high surface roughness of SiGe layers makes them unsuitable for device fabrication (See US Patent Application 2002/0185686 A1 – Paragraph 0005).

11. Claims 36-38 and 72-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2003/0139000A1 (Bedell et al.).

Bedell et al. teaches a substrate material and heterostructure comprising a Si-containing substrate, a patterned or unpatterned buried oxide insulating region resistant to Ge diffusion on top of the substrate, and a substantially relaxed SiGe layer on top of the insulating region which has a thickness of 2000nm or less and a measured lattice relaxation of from about 50 to 80% (See page 5, claims 35-43). Bedell still further teaches a strained Si layer on the SiGe relaxed layer and alternating layers of relaxed SiGe and strained Si formed on top of the strained Si layer (page 6, claims 54 and 55). Bedell finally teaches that the strained Si layer may be replaced with a lattice mismatched compound selected from the group consisting of GaAs and GaP (Page 6, claim 56).

Although Bedell fails to specifically because it would have been obvious to one of ordinary skill in the art to limit the defect density to below 5×10^7 atoms/cm², since it is known in the art that limiting defect density, such as threading dislocation density, in relaxed SiGe

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templates is optimal for device performance (See for example US Patent Application 2002/0185686 A1 – Paragraph 0015).

Further, regarding claims 72-76, although Bedell fails to specifically teach the claimed surface roughness, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the surface roughness since it is known in the art that high surface roughness of SiGe layers makes them unsuitable for device fabrication (See US Patent Application 2002/0185686 A1 – Paragraph 0005).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Stein whose telephone number is 572-272-1544. The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 5:00 p.m. If the attempts to reach the examiner are unsuccessful, the examiner's supervisor, Deborah Jones can be reached by dialing 571-272-1535. The official fax number is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

May 1, 2004



Stephen J. Stein
Primary Examiner
Art Unit 1775